

# Making Decisions



## Target Grade Levels

Third - Ninth

## Time

40 minutes

## Materials

- chalk
- chalkboard (or a flip chart and markers)
- guest presenters: *air quality professionals, economists, EPA specialists, EPA policy analysts, or meteorologists*

## Knowledge and Skills (TEKS)

- Science:
  - Demonstrate safe, environmentally appropriate, and ethical practices;
  - Learn to use and conserve, dispose and recycle resources;
  - Observe and record changes in states of matter caused by heat and conduct tests, compare data, and draw on conclusions about physical properties of matter-states, conduction, density, and buoyancy; and
  - Identify and observe effects of events that require time for change to become noticeable.

## Overview

This exercise lets students explore how decisions are made. Students will practice solving problems that have choices.

## Background Information

Making decisions is an important part of life for everyone—students, executives, homemakers, shopkeepers, or scientists. Solving a problem requires comparing alternatives and thinking about the probable results of one's choices. Every choice, or decision, leads to certain direct results and more indirect results. Many choices will end up influencing or limiting future decisions. For example, choosing a hamburger for lunch might mean that one is less inclined to choose meatloaf for dinner. Or deciding to spend money for a new bike now may mean forfeiting the money for a new computer game. The worst kind of decisions are those made on a whim, without thinking through the consequences. The best kind of decisions are those made after thinking about the possible alternatives, and the advantages and disadvantages of each.

One way to begin a thoughtful decision-making process is to ask yourself questions and find honest answers for them. Typically, a number of limitations affect the quality or cost of the decisions we make. Cost does not necessarily mean money. It could also be any valuable thing that is given up in order to implement the choice, such as time or lost opportunities. Clearly, there is a trade-off between getting all the best information and spending too much time fussing over the choice. Sometimes, you spend so much effort collecting or weighing alternatives that you run out of time or money or both and lose much of the benefits of careful decision-making. Sometimes, what we all call "common sense" is the best decision, but if you think about it, simple common sense usually has a good reason behind it.

Many important decisions are made after a careful and formal analysis, some-times called a “benefit-cost” analysis. It usually is structured by writing down all the advantages or “pros” on one side of a page, and all the disadvantages or “cons,” on the other side. Then by comparing the pros and cons one can systematically arrive at a “best” decision. One mark of a good decision based on careful thought is that none of the results or consequences of the decision—good or bad—should come as a surprise. If one makes a decision with too little information about its consequences, then there is a greater “risk” involved that the decision may not solve the problem or that the decision may cause an unforeseen problem. Making good decisions is a skill that comes about with practice and experience. Nobody is “born” with it. Also, the confidence that comes with practice often results in better and quicker decisions.

Additional complexities must be considered in the realm of environmental decision-making. True environmental costs are hard to determine with conventional methods, yet everything we do has myriad effects on the environment. Even breathing adds to carbon dioxide in the atmosphere and could worsen global climate change. When participating in any decision-making process, it is important to consider the following special environmental factors:

- 1) What natural resources must be used to create this item?
- 2) What natural resources must be used to operate this item?
- 3) Are there renewable resource alternatives that can reduce long term cost for creation and operation?
- 4) What types of waste and pollution will this create?
  - a) Solid waste
  - b) Hazardous waste
  - c) Water pollution
  - d) Air pollution
  - e) Soil contamination
- 5) Who will be affected and or put at increased health risk by this item?
  - a) Individuals living nearby
  - b) Individuals in the watershed
  - c) Individuals in the airshed
  - d) Individuals living near a landfill that will accept waste produced by this item?
- 6) What economic harm might waste/pollution from this item cause the groups named above?
- 7) What might be the additional cost if negative effects from the waste and/or pollution result in lawsuits from the individuals named or additional taxes needed to clean up the environment as a whole due to mass pollution problems?
- 8) How can the item or process be better designed to create less waste, use less energy, emit less pollution, and use fewer natural resources?

When true environmental costs are considered, more environmentally-sensible options are usually better for the bottom line.

There are seven steps in good public decision-making:

- 1) What is the problem or issue? Ignore all the complicating issues, or “red herrings,” and articulate a clear, simple problem. Identify who and what may be affected by the problem, and who and what may benefit from the decision.
- 2) What are the options for solving the problem? Leave out all the really unlikely solutions, and just list the ones that are most realistic. Keep them as straightforward as possible.
- 3) Do I know enough about each alternative? Compare each alternative solution to the problem, and write down what is known and what needs to be researched for each.
- 4) What are the advantages and disadvantages of each alternative? Sometimes, advantages or disadvantages include the effort required to get all the necessary information. If it seems that the effort, or “cost,” of getting the necessary information outweighs the benefits, the decision-maker may need to consider his or her willingness to accept the consequent risks.
- 5) Which advantages and disadvantages are critical? Cross out those that don’t really matter; these are just confusing extras.
- 6) Which of the options seem to best solve the problem, considering the advantages and disadvantages of each?
- 7) Finally, share and discuss results publicly and with those affected by the decision even if you have already involved some of them in the process.

### **Suggested Reading**

- Berry, Joy. *Every Kid’s Guide to Decision Making and Problem Solving*. Children’s Press (1987).
- *Citizenship with Bambi and Friends* (Filmstrip). Walt Disney (1988).
- *The Environment* (Apple II computer program). Tom Snyder (1990).
- A role-playing simulation in which students address crucial environmental questions.
- *I Don’t Know What To Do: Decision-Making Skills* (Videotape). Guidance (1988).
- *A Kid’s Guide to Decisions* (Filmstrip). Learning Tree (1988).
- *The Oil Game* (Apple II computer program). AV System (1988).
- Smith, Sandra Lee. *Coping with Decision-Making*. New York, NY: Rosen Publications Group (1989).
- Ulrich-Hagner, Linda. *Decisions in Action*. South-Western Publishers (1988).
- *Understanding Decisions* (Filmstrip). Learning Tree Publishing (1990).
- *Yes? No? Maybe? Decision Making Skills* (VHS videotape). Sunburst (1990).

### **Procedure**

1) Vocabulary

- |            |                          |
|------------|--------------------------|
| a) benefit | d) environmental justice |
| b) cost    | e) airshed               |
| c) risk    | f) watershed             |

- g) solid waste
- h) hazardous waste

i) landfill

## 2) Activities

- a) Introduce the topic of decision-making to the class, write the seven decision-making steps on the chalkboard or flip chart and explain them.
- b) Have the students suggest several real or invented air pollution problems that require decisions to solve, such as, “Should I convert all my electric lights to energy-savers at home?” or “Why should we work to save the rain forest?” or “What is the best way I can contribute to the reduction of greenhouse gases?” or “How can we control the quality of the air in the classroom or school?” Assign one student to record on the chalkboard or flip chart suggestions by the students during the problem solving process. You can use current events articles that raise issues yet unresolved as a means of jogging students’ thoughts on selecting problems. Have students formulate a problem statement for each question suggested.
- c) Select a few problems to focus on and have students volunteer answers to each of the first six problem-solving steps. For each answer, get the student to specify which problem it addresses and which step it fits under. Note that the class can be considering all the problems at once. Allow students to question or comment on each others’ suggestions.
- d) Once each problem has answers under each of the first six steps, begin narrowing the selections by encouraging the class to evaluate each of the steps. Have the scribe annotate the chalkboard or easel as decisions are made. Encourage dissenters or skeptics, but get the class to consider all angles.

## 3) Review

- a) Review the students’ answers to each of the steps and ask a different student why that answer was used and whether or not that student agrees.
- b) Present the class with this decision-making scenario on which they must go through the steps together. “The San Antonio region has a problem with excess ground-level ozone pollution. Ground-level ozone pollution is created when nitrogen oxides and volatile organic compounds react in sunlight. Major regional sources of nitrogen oxides include: vehicles, power plants, off-road construction equipment, industry, and landscaping equipment. Major regional sources of volatile organic compounds include: vehicles, gasoline stations, industry, off-road construction equipment, and landscaping equipment. Something must be done to reduce these two types of pollution so that they cannot react to make ground-level ozone, which is dangerous for your health. There are a number of different strategies to reduce these pollutants, but each has benefits and costs. Evaluate the following strategies:
  - i) Mandating less-polluting but more expensive gasoline
  - ii) Restrictions on the amount that industry is allowed to pollute
  - iii) Restrictions on the amount that the power plant is allowed to pollute

- iv) Mandatory emissions inspections for all vehicles to make sure that they're not polluting more than they're supposed to
  - v) Others?
- 4) Evaluation
- a) Students can be quizzed on vocabulary and concepts.
  - b) Extension activities can be performed as graded exercises.
- 5) Extension
- a) Suggested Modification
    - i) For lower grades, decision-making can be fun but also frustrating. Use a decision-making exercise that addresses group activities such as the best way to spend time. Let the students decide how the day or an hour should be spent, and why. Modify the seven decision-making steps, as appropriate, and use them to facilitate such a discussion. For lower grades, the decision-making steps may have to be stated more simply to help students participate in the process.
    - ii) For upper grades, have students develop a subset of questions (between the lines) to explore each of the seven decision-making steps in more depth. Use the expanded list to facilitate the discussion.
    - iii) You may want to ask a guest presenter to add to the list some real world problems or issues with which he or she is currently working.
    - iv) Have students select a news clipping that raises a problem or issue that others are working to resolve. Assign a special project in which students will use the steps presented here to research and develop a potential resolution. When completed have the student present his or her findings and the rationale for the selected option.
  - b) Students can research the different strategies to reduce ozone pollution and write a short paper answering each of the steps and coming to a conclusion on which strategy or strategies they would implement.